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Illinois Coastal Management Program Issue Paper

Illinois Beach State Park and North Point Marina **Including the Dead River and Kellogg Creek Watersheds**

Introduction

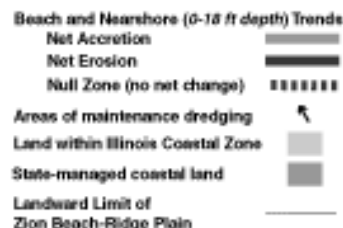
Illinois Beach State Park and North Point Marina are state-owned coastal areas managed by the Illinois Department of Natural Resources (IDNR). They are located on the far northern segment of the Illinois coast bordering the municipalities of Winthrop Harbor, Zion, Beach Park and Waukegan (Figure 1). North Point Marina is a full-service 1500-slip marina making it the largest marina along the Illinois coast and the largest in the Great Lakes. Illinois Beach State Park is consistently the most visited state park in Illinois, hosting more than two million visitors annually. This 3,070 acre state park, divided into North and South Units, preserves the last remaining shore in the state with natural coastal dunes and wetlands, a coastal flora of exceptional high quality, and a segment of shore free of any shore-protection structures. The state park and marina together comprise a recreational and natural-area resource that is without comparison along the Illinois shore.

The state park and marina are located within a coastal setting stressed by natural processes such as beach and nearshore erosion, invasive species, and a variety of hydrologic issues. Within the Illinois Coastal Management Program (ICMP), the state park and marina are worthy of designation as a geographic area meriting special attention. This coastal area presents unique challenges for preserving the biological diversity, history, natural beauty, and recreational opportunities for this and future generations.

Significance of Illinois Beach State Park

Illinois Beach State Park is part of a much larger biological unit of over 4,000 acres of contiguous high-quality natural area including Spring Bluff Nature Preserve owned by the Lake County Forest Preserve District; the Zion Park District, property of the former Johns Manville manufacturing plant; and undeveloped portions of property near the decommissioned Zion Nuclear Power Station owned by Exelon Generation Company (parent company of Commonwealth Edison). This extensive complex contributes significantly to national and regional biodiversity, preserves coastal wetland ecosystems, and provides critical habitat for declining plant and animal species. Three Federally Threatened species occurring here are Piping Plover (*Charadrius melodus*), Eastern Prairie Fringed Orchid (*Platanthera leucophaea*), and Pitchers Thistle (*Cirsium pitcheri*). Also present is the Karner Blue Butterfly (*Lycaeides melissa samuelis*), which is a Federally Endangered species.

Illinois Beach State Park supports 14 natural community types as identified by the Illinois Natural Areas Inventory (INAI), including 66 acres of rare and globally declining pannes, (state conservation status-S1; global ranking-G3) and habitat for more than 500 species of plants and 300 species of animals. The state park includes 1,916 acres of dedicated nature preserve protected in perpetuity under the Illinois Natural Areas Preservation Act.



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Much of the shore within the state park was designated by the U.S. Fish and Wildlife Service as a critical habitat for the Piping Plover. The foredunes support a reintroduced population of Pitcher's Thistle. The National Audubon Society has designated the state park as an important bird habitat for its value as a significant route for coastal migratory birds. The park provides critical roosting and foraging habitat for shore birds, raptors, neotropicals, and waterfowl. The park provides breeding habitat for birds of state conservation concern.

Besides its diverse biological significance, the park has a recognized historical significance. The North Unit includes the 243-acre Camp Logan National Guard Rifle Range Historic District. Camp Logan was an Illinois National Guard Training Facility that operated between 1892 and the early 1970s. The dunes and sand prairie at the camp was the site of weapons training. The buildings and land of the camp qualified as a historic district because this is the best-remaining example of a pre-World War II National Guard training facility in Illinois, and because this camp played a major role in the evolution of the Illinois National Guard.

Setting

Illinois Beach State Park and North Point Marina are located on the Zion beach-ridge plain. This is an extensive coastal sand plain that extends for about 18 miles from near Kenosha, Wisconsin on the north southward to North Chicago, Illinois. The plain is up to one-mile wide near Zion, Illinois. Although much of the plain has a marsh-dominated appearance, closer evaluation shows that this is a complex landscape of alternating dune sand ridges and marshy swales that combine to give an elongate washboard-like topography. This landscape resulted from the progressive accretion of sand and the addition of coastal land. The successive ridges and swales correspond to successive shorelines of the sand plain as it continued to develop with time (Hester and Fraser 1973; Fraser and Hester 1974; Chrzastowski and Frankie 2000). This unique and diverse topography supports a wide range of natural communities including beach, foredune, coastal black oak sand savanna, sand prairie, fen, marsh, interdunal pond, and globally rare coastal wetland communities called panne.

Illinois Beach State Park is divided into North and South Units separated by a strip of land that is part of the City of Zion. The shore along this separation contains Hosah Park which is maintained by the Zion Park District, and the now decommissioned Zion Nuclear Power Station built by Commonwealth Edison Company and since 2001 licensed to Exelon Generation Company. This two-unit nuclear station was completed in 1973 and decommissioned on February 13, 1998 (U.S. Nuclear Regulatory Commission 2006).

The South Unit is the original part of the state park which was established in July 1953. Some commercial activities occurred in this area prior to the parkland designation such as sand mining which produced Dead Lake in the western margin of the South Unit, and film making such as an early 1900s silent western film (*The Main Trail*) with Charlie Chaplin. Despite these activities, much of the landscape was minimally impacted prior to parkland preservation. One of the factors providing the impetus for establishing the park was the early 1900s expansion of industrial land uses immediately south of the park. This land area, which is part of the City of Waukegan, includes the site of the former Johns Manville manufacturing plant built in 1922 that produced a variety of asbestos-containing building materials. Nearby is the Waukegan Generating Station which is a coal-fired power plant built by Commonwealth Edison Co. in the 1930s, and beginning in the late 1990s owned and operated by Midwest Generation, LLC. Further south is a variety of commercial and industrial land bordering Waukegan Harbor, which is a deep-water commercial harbor maintained by the U.S. Army Corps of Engineers.

The North Unit is a more recent addition to the state park. This unit consists of land that includes former residential housing, limited former commercial and industrial land, and Camp Logan, which is a registered historic site as previously mentioned. The footprint of the 72-acre basin of North Point Marina and the surrounding marina complex (built 1987-1989) occupies land that was originally part of the North Unit but has been given separate designation for administrative purposes. All of the land of the North Unit and North Point Marina was acquired by the Illinois Department of Conservation (present IDNR) during the early 1970s. Severe shore erosion along this coast was a prime impetus for residential property owners to sell to the state (Figure 2) (Bannon-Nilles 2003).

Landscape Dynamics

The geologic history of the Zion beach-ridge plain provides a framework for understanding many of the coastal management challenges that are relevant to Illinois Beach State Park and North Point Marina. This beach-ridge plain is a migratory coastal landform. The land has been migrating southward with time under the influence of net southerly littoral transport.

Prior to about 3,700 years ago all of this sand body was located along the southern Wisconsin shore between the Illinois-Wisconsin state line and the vicinity of Kenosha, Wisconsin. Wave action that produces the net southerly littoral transport along the southern Wisconsin and Illinois shore transported sand and gravel southward across the state line where it was added to the southern margin of the sand plain.

The entire Illinois portion of the beach-ridge plain subsequently formed over the past 3,700 years (Larsen 1973). Some of the sand contributing to the southward accretion originated from bluff erosion along the bluffs of southern Wisconsin, but a major source of the sand resulted from erosion along the northern reaches of the sand plain. This northern (*i.e.*, updrift) erosion combined with the southern (*i.e.*, downdrift) accretion contributed to the southward migration of the landform.

As the sand plain migrated southward along the Illinois coast, there was a corresponding southward migration along the shore of the zone that was the balance or “null” zone between net accretion and net erosion. Through historical time, the null zone has been positioned in the vicinity of the mouth of the Dead River in the state park South Unit. The shore south of this null zone has conditions favorable for net accretion; the shore north of this null zone is dominated by net erosion.

The erosional processes that led to the demise of residential developments in what is now the North Unit were processes related to the continuing southward migration of the beach-ridge plain. Individual lakeshore property owners invested in various means of shore protection in attempts to counteract the erosional trend, but the scope of these efforts were insufficient. Comparison of historical shoreline data for the area near the Illinois-Wisconsin state line indicates a long-term (150-year) shoreline recession rate averaging 10 feet per year (Jennings 1990; Chrzastowski and Frankie 2000). This is the most severe rate of shoreline recession recorded along the Illinois coast. From the vicinity of the state line, the rate of shoreline recession diminishes southward such that it is zero in the null zone near the mouth of the Dead River.

The 1987-1988 construction of the rubble-mound breakwaters for North Point Marina has eliminated the threat of shoreline recession along the marina segment of coast. However, the unarmored shore in the state park North Unit immediately south of the marina remains subject to the long-term erosional trends. Erosion along this part of the North Unit is further exacerbated by the marina breakwaters creating a partial barrier to the southward transport of littoral sand that might otherwise reach this shore from the north.



Figure 2. 1970s view of severe shore erosion along what is now the North Unit of Illinois Beach State Park. The Zion Nuclear Power Station is under construction in the distance (photo by Illinois State Geological Survey).



Figure 3. 1990s view of sand being placed and graded on the North Unit feeder beach. This feeder beach would typically be built 10 to 15 feet or more above lake level in order to contain the supplied sand volume (photo by Illinois State Geological Survey).

A landscape dynamic that influences the inland area of the state park is the supply and movement of surface water. The Zion beach-ridge plain is the focal point of the watersheds for several streams that originate in the uplands to the west and have headwater areas as far as four miles inland from the lake shoreline. Drainage to these streams is generated from two locally delineated sub-watersheds identified as Kellogg Creek Watershed, which drains to the North Unit of the park, and the Dead River Watershed, which drains to the South Unit of the park (Figure 1).

The Kellogg Creek watershed elevation ranges from about 750 feet above mean sea level in its western margin to 578 feet above mean sea level in the park near the Lake Michigan shore. The Kellogg Creek watershed includes the North and South Branch of Kellogg Creek, and a separate unnamed tributary to the north that has been recognized by some locals as Dead Dog Creek. An area of Wisconsin is also drained through this creek. Kellogg Creek and Dead Dog Creek have been channelized since early industrial development, resulting in reduced natural function compared to the meandering and intermittent wetland flooding that naturally occurred. Kellogg Creek is a perennial stream that drains to the North Unit of the park through a bluff/ravine system that is moderately to severely eroded.

The elevation of the Dead River watershed also ranges from about 750 feet above mean sea level in its western margin to 578 feet above mean sea level near the park shoreline. The Dead River watershed from north to south includes: 1) a short unnamed tributary that drains directly to the park; 2) the North and South Branches of Bull Creek, which also include drainage from the 27th Street Tributary in Zion; and 3) a second unnamed tributary that drains directly to the park from the southern portion of the watershed along with the Glen Flora Tributary. The largest of these streams is Bull Creek, which has a watershed across an extensive area of Zion, Beach Park and Waukegan (Figure 1). Similar to Kellogg Creek, Bull Creek is a perennial stream that drains to the South Unit of the park through a bluff/ravine system that is severely eroded along much of its length.

Bull Creek becomes Dead River once it descends from the uplands and begins to traverse the sand plain. The Dead River is an unaltered natural tributary to Lake Michigan that flows through an extensive high quality coastal wetland complex. Habitat of this type is rare in the Lake Michigan watershed of Illinois and provides important spawning and nursery habitat for inter-jurisdictional fish species as well as other wetland functions.

The Kellogg Creek watershed covers an area of 8,143 acres, while the Dead River watershed is 10,254 acres. The largest class of land use in both the Dead and Kellogg watersheds is suburban residential, making up approximately 25% of the total land area. There is considerably more agricultural land remaining in the Kellogg Creek watershed (~15%), while the Dead River watershed is only about 2% agricultural use. The wetland complex of the park comprises a significant area of both watersheds, making wetlands the largest class of land cover. Approximately 27% of the Kellogg Creek watershed and 32% of the Dead River watershed is wetland.

The year 2000 population of the Kellogg Creek watershed was 20,240. If the land area of the largely unpopulated coastal sand plain is subtracted from the total watershed area, the resulting population density is approximately 3.1 persons/acre. In 2000, 34,361 people lived in the Dead River watershed. The population density inland of the coastal sand plain is approximately 4.9 persons/acre. Urban growth across the watershed in the municipalities of Winthrop Harbor, Zion, Beach Park and Waukegan has contributed to increased volume and velocity of water in these streams and thus greater volume of water reaching the stream channels and adjacent wetlands on the sand plain. To varying degrees, it is likely the plant and animal populations within the state park have been impacted by these urban-influenced changes to the surface-water conditions. However data are lacking in order to adequately evaluate this impact.

The hydrology of Dead Dog Creek was studied in the late 1980s (Kubillus 1994), and the hydrology of the state park was studied in detail in the late 1970s (Visocky 1977). In 2006 and 2007, hydrology and hydraulics were modeled for the Dead Dog Creek, Kellogg Creek, Bull Creek and Glen Flora Tributary drainages as part of a multi-year watershed planning effort directed by the Lake County Stormwater Management Commission (SMC).

The Lake County SMC completed a detailed stream inventory for all of the watershed tributaries in 2001 that characterizes and measures the physical features of the channel, hydraulic structures and discharge pipes and swales. Erosion, siltation, pool/riffle development, channel substrate composition, debris loads, in-stream habitat features and the riparian corridor were all included in the inventory and documented with GPS locations and photographs. In addition to the stream inventory, the Lake County Health Department collected water quality and flow data for the 2006-2007 sampling seasons. Data for the water quality assessment is collected in 15-minute intervals using data sondes and flow meters in Dead Dog Creek, Kellogg Creek and Bull Creek.

In 2006, the Lake County SMC oversaw the formation of stakeholder planning groups for both the Kellogg Creek and Dead River watersheds. The watershed planning scope evaluated by these groups addresses flood damage reduction, natural resource protection and enhancement, water quality improvement, a parcel-level green infrastructure inventory, and education and outreach. The watershed plans that result from these efforts will include detailed programmatic and site-specific action recommendations to improve watershed resources.

Issues of Concern

Illinois Beach State Park and North Point Marina present both challenges and opportunities for effective coastal zone management, preservation and restoration. Only the Calumet area, which similarly has natural areas in juxtaposition with commercial/industrial land, presents similar challenges and opportunities. However, the Calumet area is primarily an inland setting while the state park and marina are an open-coast setting subject to the Lake Michigan dynamics of waves, currents and ice.

Seven issues of concern are identified and discussed in the following sections. These are not listed in an order of priority. However, sand issues along the shore, both erosion and accretion, have been and will continue to be major coastal management issues.

1) Shore Erosion

For decades, shore erosion has been a primary coastal management issue at Illinois Beach State Park (U.S. Army Corps of Engineers 1953; Tetra Tech 1978). The geologic history of this migratory coastal landscape confirms that erosion is part of the natural dynamics of this coastal system. The potential for the most severe erosion presently occurs along the shore of the North Unit immediately south (downdrift) of North Point Marina. This is part of the naturally occurring erosional shore along the northern end of the beach-ridge plain. However, erosion is accentuated by the lack of any appreciable littoral sediment supply from the north.

Shore erosion along the state park North Unit provides the supply of littoral sediment that moves southward and eventually reaches the South Unit. This southward moving sediment supply contributes to a more balanced sediment budget toward the south. As a result, there are diminishing rates of shore erosion progressing southward toward the null zone centered near the mouth of the Dead River. However, all of the state park South Unit could have erosion as severe as what occurs in the North Unit if the supply of littoral sediment is disrupted. There is nothing inherent in the geology of the South Unit that contributes to the diminished erosion rates other than the littoral sediment supply from the north.

Since the late 1980s, the IDNR has used beach nourishment as the primary means of managing the shore erosion (Figure 3). Nourishment sand has been stockpiled at two designated feeder beaches from which wave action has been allowed to erode and transport the sand southward and nourish the beach and nearshore. One feeder beach has been along the shore at the north end of the North Unit (Figure 1). A second feeder beach, used less frequently, has been along the shore at the north end of the South Unit. Sand supplied to these feeder beaches by truck during the late 1980s and 1990s was derived from a variety of sources including dredging at North Point Marina or nearby Prairie Harbor Yacht Club, dredging at the Waukegan Generating Station, or import of sand purchased from inland sand pits. Sand has also been supplied to the nearshore area opposite the North Unit feeder beach by hopper barge with sand derived from dredging at the entrance channel to Waukegan Harbor, or by slurry pipe from dredging at the entrance to North Point Marina.

Evaluation of the littoral sediment budget along the state park shore indicates a need for a minimum of 80,000 cubic yards per year to maintain a balanced annual sediment budget (Foyle, Chrzastowski, and Trask 1998). This volume of sand nourishment has been supplied to the state park during some years. However, there have also been years of lesser volume supply as well as years of no beach nourishment. Monetary constraints and securing sand that meets permit standards have been major obstacles in assuring sustained annual beach nourishment.

In 1999, the IDNR formed a Task Force for Coastal Stewardship to evaluate options for the long-term coastal stewardship of the state shoreline at Illinois Beach State Park and North Point Marina (IDNR Task Force for Coastal Stewardship 2001). A primary objective of this task force was to evaluate all options for managing shore erosion at the park. This task force, comprised of IDNR scientific and technical staff, determined that beach nourishment was preferable to any type of engineered shore protection such as breakwaters, groins, or revetments. Maintaining the naturally occurring movement of sand along the beaches was determined to be critical to maintain habitat quality for nearshore fisheries, and rare coastal plant and animal communities. Unarmored shoreline and dynamic sand movement are essential to maintain open habitat for successfully re-introduced federally threatened Pitchers Thistle populations and to preserve the landscape qualities required for the federally endangered Piping Plover. Maintaining a shore free of any additional shore structures was also considered an important aesthetic objective for the benefit of future generations.

Recognizing the challenges in assuring an adequate sand supply for an annual beach nourishment program, the Task Force suggested development of partnerships with neighboring property holders that have to manage a surplus of littoral sand. For example, the U.S. Army Corps of Engineers which periodically dredges the entrance channel to Waukegan Harbor, Midwest Generation Corporation which dredges the intake channels for the Waukegan Generating Station, and Prairie Harbor Yacht Club which dredges its entrance channel. This proposed partnership relates to the issue of coastal management at the State Park and North Point Marina being part of an integrated coastal management plan for the distinct littoral cell that exists between the Illinois-Wisconsin state line and Waukegan Harbor.

The Task Force also recommended a sand conservation and recycling program that would mimic the natural dynamic coastal sand movement and preserve the landscape and habitat characteristics. Sand eroded from the northern segment of the state shoreline would be captured at the southern end of the state shoreline. From there, the sand could be transported northward by truck or barge, placed along the shore, and allowed to again be transported southward. Construction of a groin or similar structure at or near the south end of the South Unit would provide the needed sediment trap. Partnership with the Waukegan Generating Station could provide a benefit of reduced sand volumes reaching the water intake channel for the plant, which requires intermittent dredging (IDNR Task Force for Coastal Stewardship 2001; Bridges and Etemma 1999).

This sand conservation and recycling effort could have considerable benefits. It would be less costly than conventional beach nourishment of purchasing sand from inland sources. The effort would address the problem of sand accumulation (sand surplus) at the power plant intake channel and the harbor approach channel, as well as the problem of erosion (sand deficit) that threaten to destroy portions of the Nature Preserve and rare coastal natural areas. What are not known with certainty are the potential negative impacts of deprived sediment supply along the shore to the south (downdrift) of the proposed groin or similar structure. Modeling would be necessary to determine the potential coastal changes.

2) Detrimental Sand Accumulation

Although erosion and a deficit of sand is the dominant shore management issue along most of the state park shore, the North Point Marina area faces the opposite condition of a surplus of littoral sand and detrimental impacts from this surplus. This condition results from a limited but persistent net southerly transport of littoral sand across the Illinois-Wisconsin state line.

The north breakwater of the marina forms a partial barrier to this net southerly transport. This partial barrier results in sand accumulation at North Beach which is the 1,000 foot long beach between the state line and the north breakwater, as well as across the North Beach nearshore. Sand accretion in the North Beach area contributes to shallower water depths and allows wave action to move sand southward around the north breakwater and into the area near the marina entrance (Moffatt and Nichol Engineers 1986; Chrzastowski 2003).

Northerly waves have the potential to continue moving sand past the marina entrance and southward to the state park shore. However, sand that can accumulate near the marina entrance has the potential for being transported by southeasterly waves into the marina and be deposited in the approach areas to the marina's recreational and commercial basins. This sand accumulation reduces water depth and restricts the useable width of the marina entrance channel. This sand accumulation thus compromises navigation safety into and out of the marina. Once sand accumulates within the marina, there is no wave or current action that can return this sand outside the marina basin. The sand accumulated within the marina requires intermittent dredging. Sand dredged from the marina has been used for beach nourishment along the shore immediately south of the marina.

A sand management challenge for the marina is the periodic removal of sand that accumulates in the North Beach area in order to maintain a beach and nearshore profile equal to that at the time of marina construction (1987-88). As of 2006, such a sand removal effort has not been done. Such removal would benefit the marina in reducing the volume of sand that might bypass the north breakwater and become deposited in the marina entrance area. An additional opportunity for sand management is the construction of an excavated area on the lake bottom immediately south of the state line to form a sand trap. Littoral sand in transport across the state line could be intercepted within this trap and thus prevent further transport toward the marina entrance (Chrzastowski 2003). Periodically dredging of this sand trap would maintain its function. Dredged sand could be used as beach nourishment immediately south of the marina.

3) Asbestos

In July 1997, in the vicinity of the Resort and Conference Center, a piece of beach debris was identified as asbestos containing material (ACM). Subsequent evaluation along the state park beach determined the random occurrence of additional pieces and chunks of ACM (Cali *et al.* 2006).

The ACM was identified as transite which was a common building material used in the 1950s and 1960s for water supply pipes. Other pieces included house siding, floor tiles and roofing material as well as

brake linings and clutch faces. All of the ACM was non-friable with the asbestos fibers held within a cement matrix. Although not posing a hazard to public health, the occurrence of ACM along the beaches at Illinois Beach State Park became a public concern and a public relations issue.

Subsequent surveys by the IDNR and its consultants (Hanson Engineers 1998) found the ACM scattered along the beach in the North and South Units, as well as concentrations of the ACM such as used as a road base along a fire access road in the southern part of the South Unit. Regular beach sweeps were done by park staff and contractors to collect and properly dispose of the ACM found on the beach.

The potential source or sources for the ACM were considered. One potential source was the Johns Manville manufacturing facility located immediately south of the South Unit which manufactured various building products that contained asbestos. This source was identified as providing the ACM used in the road base in the South Unit. For the ACM along the park beaches, this source was problematic because net littoral transport would move any beach ACM southward from the Manville property and thus away from the state park.

A potential source for much of the ACM found along the beach was determined to be former residential housing and the associated subdivision infrastructure that had existed prior to the 1970s in what is now the North Unit. Although the houses were leveled once the state acquired the land, the subsurface infrastructure such as water supply pipes and sewer pipes were not removed. Some ACM had apparently been introduced to the beach and nearshore zone while abandoned houses were deteriorating along the beach (Figure 2). Shore erosion potentially intercepted some of the buried transite infrastructure. In addition, subsurface ACM could have been intercepted during excavation and dredging for the North Point Marina basin in 1987-88. This material, totaling an estimated 1.5 million cubic yards, was disposed along the shore south of the marina and used as beach nourishment (Chrzastowski 1991; Terpstra and Chrzastowski 1992).

Concern that there might be a public health hazard caused by asbestos fibers in the beach sand led to detailed examination of the beach sand characteristics authorized by the Illinois Office of Attorney General. This study was done by the Great Lakes Center for Excellence in Environmental Health at the University of Illinois-Chicago School of Public Health. The final report of that study was published in 2006 (Cali *et al.*, 2006). This comprehensive evaluation determined that there was no risk to public health. The study also concluded that sand obtained from dredging such as at the entrance to Waukegan Harbor or the entrance to North Point Marina could be used for beach nourishment without posing a health risk, assuming that the sand met all permit testing requirements.

The occurrence of ACM at Illinois Beach State Park will remain a management and public relations issue for some time. Controlled burns as part of the park restoration and conservation often expose ACM that remains from the previous land uses but had been hidden by overgrowth. Once exposed, this ACM needs to be recovered and properly disposed of. Continued beach surveys are necessary to collect and properly dispose of ACM that is in transport along the shore.

The asbestos issues at the park present a special need for public information. There has been considerable media attention focused on the asbestos issues at the park. Conflicting media coverage has contributed to some public misunderstanding of the issues.

4) Invasive Species

Illinois Beach State Park provides habitat for over 50 state-threatened and endangered species. The unique and diverse ridge and swale topography supports a wide range of natural communities including beach, foredune, coastal black oak sand savanna, sand prairie, fen, marsh, interdunal pond, and globally

rare coastal panne communities that have been preserved from pre-settlement time. Large portions of the site remain relatively pristine, which is a rarity in the Lake Michigan watershed of Illinois. These characteristics justify the rating of this park as the highest quality natural area in Illinois. The protection, conservation and management of this habitat is thus of prime importance for the people of Illinois in this and future generations.

These nationally significant resources are threatened directly and indirectly by the expansion of invasive plant species (both exotic and aggressive native species). Although fire management and invasive-species control are conducted annually, historic residential and industrial land uses, post-settlement fire suppression, and increased abundance of invasive species adjacent to the park have facilitated the establishment and spread of invasive species within the complex.

There are 21 invasive species including aggressive trees and brush being actively managed at the site. With limited manpower and funds, small (new) infestations in high-quality areas are given top priority to protect the biological integrity of the best natural communities. Many invasive species occur in multiple locations, and often large populations in low-quality areas never get to the top of the management priority list. This leaves these populations to continue to be a source of re-infestation of high-quality areas by means of being carried by visitors, mowing equipment, animals, water, and wind. Without large-scale, intensive, control efforts and regular follow-up control, as native plant diversity is replaced by a monoculture of invasive species, there will be a gradual degradation of the natural communities and thus a degradation of the biological and aesthetic value of this national treasure.

IDNR staff and volunteers have contributed to the efforts to control invasive species on the site. Stewardship and grant funding is continually being sought and received, but has not been adequate to keep ahead of the problem. Sustained funding for invasive-species control and habitat restoration is critical.

5) Hydrology

A critical environmental issue for Illinois Beach State Park is the volume and quality of surface water that enters the park from neighboring land. The state park is the downstream end of several extensive watersheds that cover the urban, suburban and rural landscape across the uplands west of the park (Figure 1). The upland watershed impacts the surface water and groundwater systems within the park. Water of degraded water quality can be detrimental to the park's plant communities, and flooding can and has been detrimental to the park infrastructure such as roadways and trails.

Surface water bringing sediment and pollutants into the park presents an environmental stress. However, the hydrology of the site has been altered not only by changes in the watershed, but also by alterations within and adjacent to the park such as roads, culverts, channelization, and ditching. Ditches and culverts have often become clogged with debris and sediment, and in some cases diminished culvert flow has caused flooding in areas that have not historically flooded. Flooding may have contributed to the degradation of the plant community in some affected areas.

Study of the hydrology of the park that was done in the 1970s (Visocky 1977) provides valuable reference data for park hydrologic conditions at that time. However, land use and land cover in the upper watershed has significantly changed since that study. No comparable study has since been done. Understanding the hydrology of Illinois Beach State Park is an important research need requiring a detailed evaluation of how the hydrology of the park area may have been altered during historical time by stream channelization and rerouting, restricted flow through culverts, and increased localized runoff related to park and marina roads and parking facilities. Also, it is unclear as to how the hydrology of the park is being affected by near historic low lake levels that have persisted in recent years. Hydrologic study of the park area should

interface with hydrologic studies across the upland watershed by the municipalities or by the Lake County Stormwater Management Commission.

Several specific questions related to the state park hydrology need to be addressed:

- What hydrological factors in the state park and in neighboring wetlands (Spring Bluff Forest Preserve and Chiwaukee Prairie on the Wisconsin side of the state line) could be impacting the plant communities?
- How has the hydrology at the state park changed over time and how have such changes impacted the vegetation?
- How does surface water move through the state park, what are the volumes, and where are surface-water divides that distinguish different intra-park watersheds?
- What hydrologic factors are important to reverse or mitigate the invasion of high-quality sedge meadow marsh and panne by cattail monoculture?
- How are park roads and culverts affecting the park hydrology?
- What is the dynamic relationship between the state park hydrology and Lake Michigan water levels?
- How does shoreline recession impact groundwater levels in the swales near the shore as opposed to swales farther inland? This is particularly relevant to the protection of the close-to-shore panne communities and the state-listed species they support.
- How does water in the Johns Manville industrial canal impact ground or surface water in the South Unit Nature Preserve?

6) Education and Outreach

Illinois Beach State Park provides an exceptional setting for the study and teaching of the biology and geology of this unique coastal setting. Education and outreach are critical components to the functions of the state park. Adequate and sustained funding for these activities is crucial. The public will benefit from state-of-the-art educational displays and educational materials at the Visitor Center, park office, and at the Resort and Conference Center.

North Point Marina presents additional opportunities for education and outreach to a different visitor group. The recreational boaters that annually frequent the marina are an audience for information related to the resource and environmental issues of the Lake Michigan coastal zone such as water quality, fisheries, and coastal dynamics. The marina Administration Building provides opportunities for distribution of information brochures as well as having information displays. Opportunities exist for information kiosks and bulletin boards disbursed throughout the marina complex, as well as using the marina web site as an education and outreach tool.

7) Integrated and Holistic Stewardship

One of the long-term challenges in the stewardship of the public land and resources at Illinois Beach State Park and North Point Marina is recognizing the differences in management needs between these two

properties: one having a strong focus on natural-area conservation, and the other exclusively a recreational area. Effective stewardship of the state park and marina requires that coastal zone planning and management at these two adjacent properties be integrated and compatible. One example of such integration would be assuring that land uses at the marina complex do not have a detrimental impact on flora or hydrology of the adjacent state park natural areas.

Effective stewardship of this state park and marina also requires planning and management to have a regional perspective. The state park and marina are part of the Zion beach-ridge plain which has landscape, process, and habitat characteristics that extend beyond the limits of the state-owned property. The hydrology of the state park is related to the hydrology of the watersheds that extend inland from the parkland. In addition, the marina and state park shore are part of a littoral cell or “compartment” along the shore through which sand transport has a beginning and end. For this far northern reach of the Illinois coast, a littoral cell exists from the Illinois-Wisconsin state line southward to the entrance to Waukegan Harbor. Effectively managing the beach and nearshore sand resources along the 6.5-mile state-owned shore benefits from integrating these efforts with sand management along the entire 9.7-mile reach between the state line and Waukegan Harbor.

Sand that is captured in the maintenance dredging at the entrance to Waukegan Harbor was nearly all derived from erosion along the state park shoreline. Once this sand is dredged at the Waukegan Harbor entrance, returning this sand by barge to the updrift beach or shallow nearshore at the north end of the state park (a sand management technique called “backpassing”) is an efficient means to conserve sand resources along the state park shore and manage the long-term erosional trends.

Other Issues of Concern

Public Access

Improving and enhancing public access to and through the parkland and to the beaches and water’s edge is important at both the state park and marina. This includes trails, bridges, bike paths, and handicap access. Raised viewing platforms have been used in the past as an effective means for visitors to gain a vantage point to view across the park and marina landscape. Use of such platforms should be expanded and maintained. Where the opportunity exists, bike paths and trails should be integrated with paths and trails of the neighboring municipal parks and public areas as part of a local network. Such integration includes linking with the Northeastern Illinois Greenways Plan and the Northeastern Illinois Blueways (Water Trail) Plan.

Land Acquisition

If opportunities arise to acquire adjoining land to the existing state holdings at the park and marina, these opportunities should be explored and evaluated as they occur. The state’s Open Land Acquisition and Development fund can provide funding for such action.

Water Quality

Monitoring of water quality is necessary at the swimming beaches at the state park and at North Beach adjacent to North Point Marina. Real-time information on water quality is important for decision making on beach closures. Public information on water quality needs to be disseminated.

Park and Marina Signage

Maintaining and expanding durable and high-quality signage is important. Both informational and educational signage is important. Signage in both English and Spanish is recommended consistent with the large population of Spanish-speaking visitors to the state park.

Beach Sweeps

Regular patrol and cleanup of beach litter and debris is necessary for beach aesthetics as well as public safety. Relict building materials scattered along the beach, particularly in the North Unit, need to be collected and properly disposed of. These litter and debris cleanups are in addition to removing any asbestos containing material (ACM) along the beach.

Nature Preserve Conservation

Some portions of the designated nature preserves within the state park have restricted access in order to protect these areas from human impact. Where the designated nature preserves abut heavily used public access areas, signage or other means are needed to clearly identify sensitive natural communities or research areas having limited or restricted access. Managing restricted access to the South Unit nature preserves may become a difficult and critical issue along the south boundary of the state park as redevelopment of former industrial land introduces municipal parkland and residential properties.

Habitat Conservation, Restoration and Enhancement

Conserving, restoring and enhancing habitat at the state park will remain an important issue. Fish habitat is included in this focus and can include fish habitat at Sand Pond in the North Unit, within select areas of North Point Marina, and in both the nearshore and offshore zone along the entire marina and state park shore.

Management Considerations

The coastal management at Illinois Beach State Park and North Point Marina is the responsibility of the IDNR through the appropriate offices that provide management or technical assistance. These include the IDNR Office of Land Management, Office of Resource Conservation, Office of Water Resources, and Office of Scientific Research and Analysis. Interfacing with the U.S. Army Corps of Engineers Chicago District is important because of permitting requirements as well as the long-term Army Corps interest in erosion management along this coastal reach.

Partnerships with the management authorities of neighboring properties can be beneficial for a more integrated management approach. Such partnerships can be developed and nurtured with the Lake County Forest Preserve, the Lake County Stormwater Management Commission, the municipalities of Winthrop Harbor, Zion, Beach Park and Waukegan, and all of the non-state property owners between the state line and Waukegan Harbor.

Communication hindrances and limited funding are challenges to overcome in developing and maintaining a holistic and regional coastal management program. Another hurdle is the contrast in land use within this coastal reach. This spectrum of land use includes natural area preservation, active and decommissioned power plants, a Superfund site (former Johns-Manville property), and proposed and planned residential uses (former industrial land near Waukegan Harbor).

ICMP Opportunities

The ICMP has exceptional opportunity for contributing to the long-term coastal management at Illinois Beach State Park and North Point Marina. The grant assistance from the ICMP can maintain sustained funding for coastal management purposes that has not been possible prior to this program.

Monitoring of Coastal Change

A sustained annual coastal monitoring program is needed to document beach and nearshore erosion, accretion, and sediment transport pathways. These data will assist in computing sand budgets for beach nourishment as well as build a database of annual coastal change.

Hydrologic Monitoring

Evaluation and periodic monitoring are needed to evaluate the hydrologic characteristics of the state park as well as the upland watershed. This monitoring will provide valuable scientific data for coastal wetlands management, conservation, and restoration. This monitoring is crucial as a guide in implementing Best Management Practices (BMPs) in the park as well as the upland watershed.

Hydrologic Restoration

Both the coastal wetlands of the park and the watershed's stream system would benefit from the installation of run-off reduction and infiltration BMPs in the upland areas of the watershed.

Natural Area Restoration

Prescribed burns, invasive species control, and brush clearing will remain important in order to preserve and restore natural plant communities and combat invasive species. The ICMP can assist in the planning and execution of these restoration efforts.

Sand Conservation and Recycling

The ICMP can assist with the planning and implementation of a sand conservation and recycling program that would mimic the natural net southward movement of sand along the state park while mitigating any net loss of sand.

Stream Restoration

Bull, Kellogg and Dead Dog Creeks have significant areas of severe erosion in the stream channels due to the down-cutting of the streambeds and the bank erosion that have resulted from an increased volume of stormwater discharge. Both the park and the upland areas of the watershed would benefit greatly if the stream channels were stabilized and restored by removing and controlling invasive plant species and using bio-engineering practices to stabilize the grade and banks to accommodate the existing flows.

Historical Heritage

Camp Logan is a registered historic district and several historic buildings are preserved within this district, but there are minimal amenities for visitors to explore the camp and learn the history of this site. The ICMP can assist in preserving, enhancing, and promoting Camp Logan as a place of historical heritage important to the State of Illinois.

Education and Outreach

The ICMP can provide the grant assistance to bring the education and outreach efforts at the state park and marina to their full potential. Nowhere else on the Illinois coast is there such a natural laboratory for coastal dynamics, the study of natural communities, or the conservation and reintroduction of rare species.

Existing Committees

The IDNR has established ad hoc committees as the need has arisen to address environmental management issues at Illinois Beach State Park and North Point Marina. The IDNR Task Force for Coastal Stewardship 2001 is a prime example. There have also been ad hoc committees to address asbestos issues, marina dredging, and beach nourishment.

The IDNR should establish a permanent committee for interacting with the ICMP in the proposal and oversight of grant assistance at the state park and marina. It is recommended that this committee be led by the IDNR Office of Legal Counsel as long as the primary management issues at the park and marina have environmental legal aspects.

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